

UNITED STATES PATENT OFFICE.

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KINETOGRAPHIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 589,168, dated August 31, 1897.

Application filed August 24, 1891. Serial No. 403,534. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Kinetoscopes, (Case No. 928,) of which the following is a specification.

The purpose I have in view is to produce pictures representing objects in motion throughout an extended period of time which may be utilized to exhibit the scene including such moving objects in a perfect and natural manner by means of a suitable exhibiting apparatus, such as that described in an application filed simultaneously herewith, (Patent No. 493,426, dated March 14, 1893.) I have found that it is possible to accomplish this end by means of photography.

In carrying out my invention I employ an apparatus for effecting by photography a representation suitable for reproduction of a scene including a moving object or objects comprising a means, such a single camera, for intermittently projecting at such rapid rate as to result in persistence of vision images of successive positions of the object or objects in motion as observed from a fixed and single point of view, a sensitized tape-like film, and a means for so moving the film as to cause the successive images to be received thereon separately and in single-line sequence. The movements of the tape-film may be continuous or intermittent, but the latter is preferable, and it is further preferable that the periods of rest of the film should be longer than the periods of movement.

By taking the photographs at a rate sufficiently high as to result in persistence of vision the developed photographs will, when brought successively into view by an exhibiting apparatus, reproduce the movements faithfully and naturally.

I have been able to take with a single camera and a tape-film as many as forty-six photographs per second, each having a size measured lengthwise of the tape of one inch, and I have also been able to hold the tape at rest for nine-tenths of the time; but I do not wish to limit the scope of my invention to this high rate of speed nor to this great disproportion between the periods of rest and the

periods of motion, since with some subjects a speed as low as thirty pictures per second or even lower is sufficient, and while it is desirable to make the periods of rest as much longer than the periods of motion as possible any excess of the periods of rest over the periods of motion is advantageous.

In the accompanying drawings, forming a part hereof, Figure 1 is a plan view, with the top of the casing removed, of a form of apparatus which I have found highly useful for the taking of the photographs. Fig. 2 is a vertical longitudinal section on line *xx* in Fig. 1. Figs. 3 and 4 are enlarged views of the stop mechanism of the photographing apparatus. Figs. 5 and 6 are plan views of two different forms of shutters for the photographing apparatus, and Fig. 7 is a perspective view of a section of the tape-film with the photographs thereon.

Referring to the drawings, 3 indicates the transparent or translucent tape-film, which before the apparatus is put in operation is all coiled on a reel in the sheet-metal box or case 1, the free end being connected to an empty reel in the case 2. The film 3 is preferably of sufficient width to admit the taking of pictures one inch in diameter between the rows of holes 4, Figs. 2 and 7, arranged at regular intervals along the two edges of the film, and into which holes the teeth of the wheels 5, Figs. 1 and 2, enter for the purpose of positively advancing the film. When the film is narrow, it is not essential to use two rows of perforations and two feed-wheels, one feed-wheel being sufficient. Said wheels are mounted on a shaft 6, which carries a loose pulley 7—that is, a pulley frictionally connected to its shaft and forming a yielding mechanical connection. This pulley is driven by a cord or belt 8 from a pulley 9 on the shaft 10, which shaft is driven by means of the beveled gears 11 12. The wheel 12 is preferably driven by an electric motor 13, which when the apparatus is in use is regulated to run at the desired uniform speed, being controlled by the centrifugal governor 14 and the circuit-controller 15 in a well-known manner. On the shaft 10 is another pulley 16, which is connected by a cross-belt 17 to a pulley 18, also frictionally connected to its shaft, and which carries the reel to